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Application No. 10/716,190
Filed: November 18, 2003
TC Art Unit: 1732
Confirmation No.: 4133

REMARKS

Claims 1-10 are currently pending. Claims 1-10 have been rejected under 35 U.S.C. § 103(a). Claim 1 has been amended. No new matter has been added. The Applicants respectfully traverse the grounds for rejection based on the above amendment and the following reasons.

SECTION 103(a) REJECTIONS

Claims 1-6 and claims 9 and 10 have been rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent Application Publication Number 2002/0132075 to Friend, et al. ("Friend I") and Patent Number 6,464,908 to Friend, et al. ("Friend II"), further in view of U.S. Patent Number 4,174,413 to Yasuike, et al. ("Yasuike"). Claims 7 and 8 have been rejected under 35 U.S.C. § 103(a) as unpatentable over Friend I, Friend II, and Yasuike, further in view of U.S. Patent Number 6,382,763 to Albuquerque ("Albuquerque"). The Applicants respectfully traverse these rejections for the reasons provided below.

Claims 1-6, 9, and 10

Independent claim 1 recites a method for controlling a thickness of a skin layer on a composite product having the skin layer and a core layer. The method includes adding a carbon nanomaterial to one of a first or a second thermoplastic resin, to cause (or increase) a difference in viscosity between the resins; and injection molding both resins sequentially into a common mold, using two, separate injection machines. This process produces a composite product so as to control the thickness of the skin layer

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WEINGARTEN, SCHJURGIN,
GAGNEBIN & LEBOVICI LLP
TEL. (617) 542-2290
FAX. (617) 451-0313

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by the difference in viscosity between the two resins. More particularly, claim 1 recites that the same gate or hot runner is used by each of the injection machines. See, e.g., Specification page 6, lines 25-33. The Examiner concedes that neither Friend I nor Friend II teaches using two injection machines that share the same gate or hot runner.

According to the Examiner, however, Yasuike purports to teach "using a two-shot injection machine to form a composite having a skin layer and a core, wherein the injection machine has two barrels that share a gate or hot runner". Furthermore, the Examiner asserts that, it would have been obvious to those of ordinary skill in the art to combine Yasuike with Friend I and Friend II. The Applicants respectfully disagree.

Yasuike discloses a sandwich injection molding apparatus and process for manufacturing a multi-layered article having a core layer of a second synthetic resin disposed between two surface layers of a first synthetic resin. According to Yasuike, the viscosity of the first synthetic resin is greater than the viscosity of the second synthetic resin to control, i.e., reduce, the thickness of the core portion. See, e.g., Yasuike, col. 2, lines 49-62. As shown in FIGS. 12-14, the apparatus includes a two-barrel, single-shot type injector that surrounds the core layer resin with the surface layer resins before they are extruded. Yasuike is completely silent about adding carboniferous nanotubes to either of the resins to affect the viscosity.

Yasuike does not teach, mention or suggest a method of controlling a skin layer thickness; adding a carboniferous nanomaterial to a resin to provide a viscosity difference between the two resins; using the viscosity difference to control the thickness of the skin layer; injection molding into a mold in a

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WEINGARTEN, SCHURGIN,
GAGNEBIN & LEBOVICI LLP
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FAX. (617) 451-0313

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two-step process using a two-shot injector approach (two barrels on the same injector do not equal a two-shot injection process); or using the same gate or hot runner for introducing the resins into the mold (with Yasuike, the resins are already mated before they are extruded out of the injector and before they enter the mold). In short, Yasuike only describes a core layer and a surface layer and nothing else that is relevant to the invention as claimed in its entirety.

Although the Examiner maintains that it would have been obvious to combine the references, there is no nexus between Yasuike and the Friend references aside from a tangential "injection molding" connection. Thus, the Examiner has not made a *prima facie* case of obviousness.

As we argued in our last amendment, the Friend references do not teach, mention or suggest controlling the thickness of the skin layer by adding a carbon nanomaterial to create a viscosity difference between two layers. Friend I discloses, that

[t]he same effect can also be achieved using a special two-shot or multi-shot molding machine. This is an apparatus that has two or more barrels that inject polymeric materials into the same mold. Materials with different conductivities are placed in different barrels and injected into the mold separately to form a two or more layered part.

Friend I, page 4, ¶ 0046 (emphasis added). There is nothing in Friend I that teaches, mention or suggests that the second thermoplastic resin is "injected into said first thermoplastic resin" (see, e.g., Fig. 3); that, temporally, first the first thermoplastic resin is injected into the mold and, subsequently, the second thermoplastic resin is injected into the first

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thermoplastic resin; or that, a common gate or hot runner is used by both injection machines.

Furthermore, the Friend II reference merely discloses use of carbon fibrils in sheet molding compound composites, bulk molding compound composites, and reaction injection molded composites. Nothing in Friend II suggests, teaches or mentions injecting a second thermoplastic resin "into said first thermoplastic resin"; temporally, first injecting the first thermoplastic resin into the mold and, subsequently, injecting the second thermoplastic resin into the first thermoplastic resin; or both injection machines using a common gate or hot runner.

Accordingly, the Applicants maintain that the Friend and Yasuike references do not make obvious claims 1-6 and claims 9 and 10 under 35 U.S.C. § 103(a) and respectfully request withdrawal of the rejections.

Claims 7 and 8

Nor can the Albuquerque reference make up for the deficiencies of the Friend and Yasuike references. Particularly, Albuquerque does not teach, mention or suggest controlling the thickness of a skin layer by introducing a carbon nanomaterial into either of the resins comprising the skin layer or the core layer. More specifically, Albuquerque does not teach, mention or suggest injecting a second thermoplastic resin "into said first thermoplastic resin"; temporally, first injecting the first thermoplastic resin into the mold and, subsequently, injecting the second thermoplastic resin into the first thermoplastic resin; or both injection machines using a common gate or hot runner.

Accordingly, the Applicants believe that claims 7 and 8 are in condition for allowance and the rejections should be withdrawn.

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The Examiner is encouraged to telephone the undersigned attorney to discuss any matter that would expedite allowance of the present application.

Respectfully submitted,

ATSUSHI KOIDE, ET AL.

By: 

George W. Hartwell III
Registration No. 42,639
Attorney for Applicants

WEINGARTEN, SCHURGIN, GAGNEBIN
& LEBOVICI LLP
Ten Post Office Square
Boston, MA 02109
Telephone: (617) 542-2290
Telecopier: (617) 451-0313

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